



# Lamarre Consulting Group Inc.

25 Brookside Terrace, Smithville, ON L0R 2A0

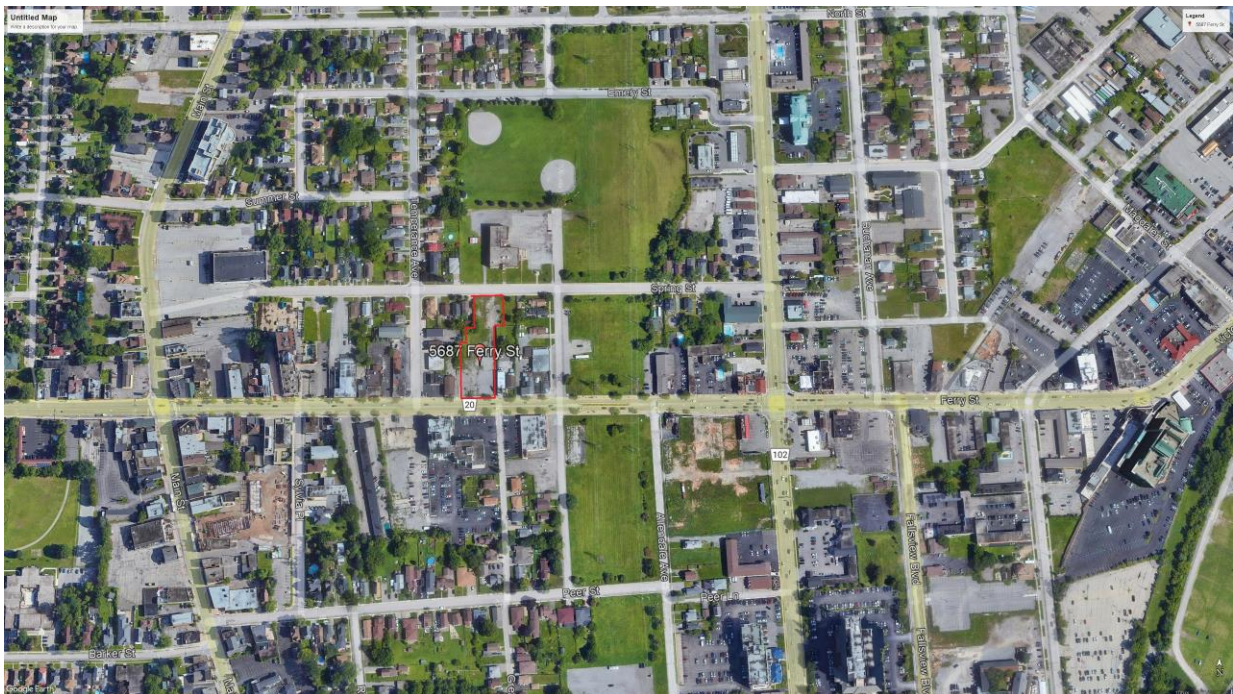
(905) 818 5205 Phone/Fax j.lamarre@cogeco.ca e-mail

February 25, 2022

Mr. Nick DeFilippis  
DeFilippis Design  
687 Barton Street East, Suite 201  
Stoney Creek, ON L8E 5L6

Re: 5687 Ferry Street, 5660 Spring Street, Niagara Falls  
Proposed Site Re-Development  
Stormwater Management Brief

The subject property is approximately 3895m<sup>2</sup> in size and is located at 5687 Ferry Street/5660 Spring Creek in the City of Niagara Falls.



**Figure 1 – Site Location**

At this stage the application is for the zoning to allow for the construction of an 8 storey building on the site of former Midtown Bowling Niagara. Based on topographic survey and aerial imagery, the former Midtown Bowling site was covered with approximately 95% impervious surfaces. Of the 3895m<sup>2</sup> site, approximately 1195m<sup>2</sup> drains surface overland to Spring Creek and 2400m<sup>2</sup> drains surface overland to Ferry Street. Based on the preliminary



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plans for the re-development the site would be covered with approximately 92.5% impervious surfaces.

Preliminary discussions with City of Niagara Falls staff state that the storm water management criteria for this site would be to control the 100yr post-development peak flow to 5yr pre-development levels. In addition, “enhanced” storm water quality treatment would be required prior to outlet to the municipal storm sewer systems.

It is proposed to achieve the required peak flow control through the installation of an underground tank. This tank would collect runoff from the entire site and would be approximately 20m<sup>2</sup> x 2.0m deep. Storm water entering the tank would be passed through a Jellyfish® JF-4-1-1 storm water treatment unit to achieve the requisite treatment.

A 200mm outlet pipe would serve to control the peak flows from the tank to the Ferry Street storm sewer. A second 125mm outlet pipe would serve to control the peak flow from the tank to the Spring Creek storm sewer. Modeling was carried out using the SWMHYMO model and is attached as Appendix A and summarized in Table 1 and 2.

**Table 1**  
**Peak Flows (Existing)**

Event	Q <sub>p</sub> m <sup>3</sup> /s (Spring St.)	Q <sub>p</sub> m <sup>3</sup> /s (Ferry St.)	Q <sub>p</sub> m <sup>3</sup> /s (Total Site)
5yr	0.049	0.110	0.159
100yr	0.082	0.185	0.268



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**Table 2**  
**Peak Flows (Proposed)**

Event	Q <sub>p</sub> m <sup>3</sup> /s (Inflow)	Q <sub>p</sub> m <sup>3</sup> /s (Ferry St.)	Q <sub>p</sub> m <sup>3</sup> /s (Spring St.)	Storage Volume (m <sup>3</sup> )	Q <sub>p</sub> m <sup>3</sup> /s (Total Site)
5yr	0.155	0.064	0.027	30.5	0.091
100yr	0.261	0.110	0.043	51.5	0.153

Storm water quantity criteria, 100yr post-development to 5yr pre-development can be achieved through the construction of a stormwater storage tank. Allowable outlet rates to Spring Street and Ferry Street could be achieved by restricting the outlet rate through the use of a 125mm and 200mm orifice pipe respectively. Storm water runoff quality criteria can be achieved through the installation of a Jellyfish® JF4-4-1 treatment unit.

Lamarre Consulting Group

John D. Lamarre, P.Eng.





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## Stage Storage Discharge 5687 Ferry Street / 5660 Spring Street

<b>Input Data:</b>	Orifice Diameter	200 mm	To Ferry Street	
	Orifice Elevation	190.00 Invert	190.1	Center
	Orifice Diameter	125 mm	To Spring Street	
	Orifice Elevation	190.00 Invert	190.0625	Center
	Orifice Co-efficient	0.62		

**Design to Control to 2yr Pre-Development Flow Rate (0.220cms)**

### Stage Storage Discharge

Elev. (m)	Incr. Elev. (m)	Area Tank (m2)	Depth (m)	Total Volume (m3)	Orifice Outlet (m3/s)	Orifice Outlet (m3/s)	Total Outflow (m3/s)
190.00	0	20	0	0	0		0
190.20	0.00	20	0.20	16	0.039	0.015	0.054
190.40	0.20	20	0.40	25	0.047	0.021	0.069
190.60	0.20	20	0.60	29	0.061	0.026	0.087
190.80	0.20	20	0.80	33	0.072	0.030	0.102
191.00	0.20	20	1.00	37	0.082	0.034	0.116
191.20	0.20	20	1.20	41	0.090	0.037	0.127
191.40	0.20	20	1.40	45	0.098	0.040	0.138
191.60	0.20	20	1.60	49	0.106	0.043	0.148
191.80	0.20	20	1.80	53	0.112	0.045	0.158
192.00	0.20	20	2.00	57	0.119	0.048	0.167



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```

2
*****
*                               *
*       5687 Ferry Street       *
*                               *
*                               *
*       DATE: June 2022        *
*       FILE: Ferry.dat        *
*                               *
*                               *
START      TZERO=[0.0]hrs, METOUT=[2], NSTORM=[1], NRUN=[1]

##*****
## 5 YEAR
##*****

CHICAGO STORM   IDUnits=2, TD=4hrs TPRAT=0.38 CSDT=5min ICASEcs=2
                TIME(min) Intensity(mm/hr)
                5      168.1
                10     103.6
                15     78.0
                30     48.1
                60     29.6
                120    18.2
                360     8.5
                720     5.2
                1440   3.2 -1 -1

##-----
## PRE DEVELOPMENT
##-----

##
## TO SPRING
##
CALIB STANDHYD  ID=1 NHYD=100 DT=5 min AREA=0.1195ha XIMP=0.95
                TIMP=0.95 DWF=0 cms, LOSS=2, CN=74
                IAper=5.0 mm SLPP=1.0% LGP=30m, MNP=0.250 SCP=0.0
                IAimp=1.0 mm SLPI=1.0% LGI=30m, MNI=0.014 SCI=0.0 -1

##
## TO FERRY
##
CALIB STANDHYD  ID=2 NHYD=100 DT=5 min AREA=0.2700ha XIMP=0.95
                TIMP=0.95 DWF=0 cms, LOSS=2, CN=74
                IAper=5.0 mm SLPP=1.0% LGP=40m, MNP=0.250 SCP=0.0
                IAimp=1.0 mm SLPI=1.0% LGI=40m, MNI=0.014 SCI=0.0 -1

## TOTAL SITE
ADD HYD         ID=3 NHYD=100 ID=1,2

##-----
## POST-DEVELOPMENT
##-----

##
## TO SPRING
##
CALIB STANDHYD  ID=1 NHYD=100 DT=5 min AREA=0.1195ha XIMP=0.921
                TIMP=0.921 DWF=0 cms, LOSS=2, CN=74
                IAper=5.0 mm SLPP=1.0% LGP=30m, MNP=0.250 SCP=0.0
                IAimp=1.0 mm SLPI=1.0% LGI=30m, MNI=0.014 SCI=0.0 -1

##

```



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\*\* TO FERRY

\*\*

CALIB STANDHYD ID=2 NHYD=100 DT=5 min AREA=0.2700ha XIMP=0.927  
TIMP=0.927 DWF=0 cms, LOSS=2, CN=74  
IAper=5.0 mm SLPP=1.0% LGP=40m, MNP=0.250 SCP=0.0  
IAimp=1.0 mm SLPI=1.0% LGI=40m, MNI=0.014 SCI=0.0 -1

\*\* TOTAL SITE

ADD HYD ID=3 NHYD=200 ID=1,2

ROUTE RESERVOIR ID=4 NHYD=200 IDIN=3 DT=2min

DISCH(cms) STORAGE(ha m)

0.000	.0000
0.054	.0016
0.069	.0025
0.087	.0029
0.102	.0033
0.116	.0037
0.127	.0041
0.138	.0045
0.148	.0049
0.158	.0053
0.167	.0057 -1 -1

\*\*\*\*\*\*\*

\*\* 100yr

\*\*\*\*\*\*\*

CHICAGO STORM IDUnits=2, TD=4hrs TPRAT=0.38 CSDT=5min ICASEcs=2

TIME(min) Intensity(mm/hr)

5	280.6
10	172.8
15	130.2
30	80.2
60	49.4
120	30.4
360	14.1
720	8.7
1440	5.4 -1 -1

\*\*-----

\*\* PRE DEVELOPMENT

\*\*-----

\*\*

\*\* TO SPRING

\*\*

CALIB STANDHYD ID=1 NHYD=100 DT=5 min AREA=0.1195ha XIMP=0.95  
TIMP=0.95 DWF=0 cms, LOSS=2, CN=74  
IAper=5.0 mm SLPP=1.0% LGP=30m, MNP=0.250 SCP=0.0  
IAimp=1.0 mm SLPI=1.0% LGI=30m, MNI=0.014 SCI=0.0 -1

\*\*

\*\* TO FERRY

\*\*

CALIB STANDHYD ID=2 NHYD=100 DT=5 min AREA=0.2700ha XIMP=0.95  
TIMP=0.95 DWF=0 cms, LOSS=2, CN=74  
IAper=5.0 mm SLPP=1.0% LGP=40m, MNP=0.250 SCP=0.0  
IAimp=1.0 mm SLPI=1.0% LGI=40m, MNI=0.014 SCI=0.0 -1

\*\* TOTAL SITE

ADD HYD ID=3 NHYD=100 ID=1,2

\*\*-----

\*\* POST-DEVELOPMENT



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---

\*#-----  
\*#  
\*# TO SPRING  
\*#  
CALIB STANDHYD ID=1 NHYD=100 DT=5 min AREA=0.1195ha XIMP=0.921  
TIMP=0.921 DWF=0 cms, LOSS=2, CN=74  
IAper=5.0 mm SLPP=1.0% LGP=30m, MNP=0.250 SCP=0.0  
IAimp=1.0 mm SLPI=1.0% LGI=30m, MNI=0.014 SCI=0.0 -1  
\*#  
\*# TO FERRY  
\*#  
CALIB STANDHYD ID=2 NHYD=100 DT=5 min AREA=0.2700ha XIMP=0.927  
TIMP=0.927 DWF=0 cms, LOSS=2, CN=74  
IAper=5.0 mm SLPP=1.0% LGP=40m, MNP=0.250 SCP=0.0  
IAimp=1.0 mm SLPI=1.0% LGI=40m, MNI=0.014 SCI=0.0 -1  
\*# TOTAL SITE  
ADD HYD ID=3 NHYD=200 ID=1,2  
ROUTE RESERVOIR ID=4 NHYD=200 IDIN=3 DT=2min  
DISCH(cms) STORAGE(ha m)  
0.000 .0000  
0.054 .0016  
0.069 .0025  
0.087 .0029  
0.102 .0033  
0.116 .0037  
0.127 .0041  
0.138 .0045  
0.148 .0049  
0.158 .0053  
0.167 .0057 -1 -1

FINISH



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```
***** SUMMARY OUTPUT *****
*****
*      RUN DATE: 2022-06-14   TIME: 17:39:01   RUN COUNTER: 000003      *
*****
* Input file: D:\WORK FILES\2022 Projects\2214 - Ferry Street Niagara Falls\Ferry.dat *
* Output file: D:\WORK FILES\2022 Projects\2214 - Ferry Street Niagara Falls\Ferry.out *
* Summary file: D:\WORK FILES\2022 Projects\2214 - Ferry Street Niagara Falls\Ferry.sum *
* User comments: *
* 1: _____ *
* 2: _____ *
* 3: _____ *
*****
```

RUN#:COMMAND#

```
R0001:C00001-----
START
[TZERO = .00 hrs on 0]
[METOUT= 2 (1=imperial, 2=metric output)]
[NSTORM= 1]
[NRUN = 0001 ]
*****
```

```
# 5 YEAR
*****
```

```
R0001:C00002-----
CHICAGO STORM
[SDT= 5.00:SDUR= 4.00:PTOT= 45.35]
{A/B/C= 608.948/ 1.500/ .726: R=.9997}
#-----
# PRE DEVELOPMENT
#-----
#
# TO SPRING
#
```

```
R0001:C00003-----DTmin-ID:NHYD-----AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C---DWFcms
* CALIB STANDHYD 5.0 01: 100 .12 .049 No_date 1:30 42.76 .943 .000
[XIMP=.95:TIMP=.95]
[LOSS= 2 :CN= 74.0]
[Pervious area: IAper= 5.00:SLPP=1.00:LGP= 30.:MNP=.250:SCP= .0]
[Impervious area: IAimp= 1.00:SLPI=1.00:LGI= 30.:MNI=.014:SCI= .0]
#
```

```
# TO FERRY
#
```

```
R0001:C00004-----DTmin-ID:NHYD-----AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C---DWFcms
* CALIB STANDHYD 5.0 02: 100 .27 .110 No_date 1:30 42.76 .943 .000
[XIMP=.95:TIMP=.95]
[LOSS= 2 :CN= 74.0]
[Pervious area: IAper= 5.00:SLPP=1.00:LGP= 40.:MNP=.250:SCP= .0]
[Impervious area: IAimp= 1.00:SLPI=1.00:LGI= 40.:MNI=.014:SCI= .0]
```

```
# TOTAL SITE
R0001:C00005-----DTmin-ID:NHYD-----AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C---DWFcms
ADD HYD 5.0 01: 100 .12 .049 No_date 1:30 42.76 n/a .000
+ 5.0 02: 100 .27 .110 No_date 1:30 42.76 n/a .000
SUM= 5.0 03: 100 .39 .159 No_date 1:30 42.76 n/a .000
#-----
```

```
# POST-DEVELOPMENT
#-----
```

```
# TO SPRING
#
```

```
R0001:C00006-----DTmin-ID:NHYD-----AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C---DWFcms
* CALIB STANDHYD 5.0 01: 100 .12 .048 No_date 1:30 41.84 .923 .000
```





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```
[XIMP=.92:TIMP=.92]
[LOSS= 2 :CN= 74.0]
[Pervious area: IAper= 5.00:SLPP=1.00:LGP= 30.:MNP=.250:SCP= .0]
[Impervious area: IAimp= 1.00:SLPI=1.00:LGI= 30.:MNI=.014:SCI= .0]
#
# TO FERRY
#
R0001:C00007-----DTmin-ID:NHYD-----AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C----DWFcms
* CALIB STANDHYD 5.0 02: 100 .27 .107 No_date 1:30 42.03 .927 .000
[XIMP=.93:TIMP=.93]
[LOSS= 2 :CN= 74.0]
[Pervious area: IAper= 5.00:SLPP=1.00:LGP= 40.:MNP=.250:SCP= .0]
[Impervious area: IAimp= 1.00:SLPI=1.00:LGI= 40.:MNI=.014:SCI= .0]
# TOTAL SITE
R0001:C00008-----DTmin-ID:NHYD-----AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C----DWFcms
ADD HYD 5.0 01: 100 .12 .048 No_date 1:30 41.84 n/a .000
+ 5.0 02: 100 .27 .107 No_date 1:30 42.03 n/a .000
SUM= 5.0 03: 200 .39 .155 No_date 1:30 41.97 n/a .000
R0001:C00009-----DTmin-ID:NHYD-----AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C----DWFcms
ROUTE RESERVOIR -> 5.0 03: 200 .39 .155 No_date 1:30 41.97 n/a .000
out <= 1.7 04: 200 .39 .091 No_date 1:33 41.97 n/a .000
{MxStoUsed=.3053E-02 m3}
#*****
# 100yr
#*****
R0001:C00010-----DTmin-ID:NHYD-----AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C----DWFcms
CHICAGO STORM
[SDT= 5.00:SDUR= 4.00:PTOT= 75.82]
{A/B/C=1012.565/ 1.500/ .725: R=.9997}
#-----
# PRE DEVELOPMENT
#-----
#
# TO SPRING
#
R0001:C00011-----DTmin-ID:NHYD-----AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C----DWFcms
* CALIB STANDHYD 5.0 01: 100 .12 .082 No_date 1:30 72.65 .958 .000
[XIMP=.95:TIMP=.95]
[LOSS= 2 :CN= 74.0]
[Pervious area: IAper= 5.00:SLPP=1.00:LGP= 30.:MNP=.250:SCP= .0]
[Impervious area: IAimp= 1.00:SLPI=1.00:LGI= 30.:MNI=.014:SCI= .0]
#
# TO FERRY
#
R0001:C00012-----DTmin-ID:NHYD-----AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C----DWFcms
* CALIB STANDHYD 5.0 02: 100 .27 .185 No_date 1:30 72.65 .958 .000
[XIMP=.95:TIMP=.95]
[LOSS= 2 :CN= 74.0]
[Pervious area: IAper= 5.00:SLPP=1.00:LGP= 40.:MNP=.250:SCP= .0]
[Impervious area: IAimp= 1.00:SLPI=1.00:LGI= 40.:MNI=.014:SCI= .0]
# TOTAL SITE
R0001:C00013-----DTmin-ID:NHYD-----AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C----DWFcms
ADD HYD 5.0 01: 100 .12 .082 No_date 1:30 72.65 n/a .000
+ 5.0 02: 100 .27 .185 No_date 1:30 72.65 n/a .000
SUM= 5.0 03: 100 .39 .268 No_date 1:30 72.65 n/a .000
#-----
# POST-DEVELOPMENT
#-----
#
# TO SPRING
#
R0001:C00014-----DTmin-ID:NHYD-----AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C----DWFcms
```



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```
* CALIB STANDHYD  5.0 01:  100  .12  .080 No_date  1:30  71.39 .942  .000
[XIMP=.92:TIMP=.92]
[LOSS= 2 :CN= 74.0]
[Pervious area: IAper= 5.00:SLPP=1.00:LGP= 30.:MNP=.250:SCP= .0]
[Impervious area: IAimp= 1.00:SLPI=1.00:LGI= 30.:MNI=.014:SCI= .0]
#
# TO FERRY
#
R0001:C00015-----DTmin-ID:NHYD-----AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C---DWFcms
* CALIB STANDHYD  5.0 02:  100  .27  .181 No_date  1:30  71.65 .945  .000
[XIMP=.93:TIMP=.93]
[LOSS= 2 :CN= 74.0]
[Pervious area: IAper= 5.00:SLPP=1.00:LGP= 40.:MNP=.250:SCP= .0]
[Impervious area: IAimp= 1.00:SLPI=1.00:LGI= 40.:MNI=.014:SCI= .0]
# TOTAL SITE
R0001:C00016-----DTmin-ID:NHYD-----AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C---DWFcms
ADD HYD          5.0 01:  100  .12  .080 No_date  1:30  71.39 n/a  .000
+ 5.0 02:  100  .27  .181 No_date  1:30  71.65 n/a  .000
SUM= 5.0 03:  200  .39  .261 No_date  1:30  71.57 n/a  .000
R0001:C00017-----DTmin-ID:NHYD-----AREAha-QPEAKcms-TpeakDate_hh:mm----RVmm-R.C---DWFcms
ROUTE RESERVOIR -> 5.0 03:  200  .39  .261 No_date  1:30  71.57 n/a  .000
out <= 1.7 04:  200  .39  .153 No_date  1:33  71.57 n/a  .000
{MxStoUsed=.5150E-02 m3}
R0001:C00018-----
FINISH
```